Omid E. Kia
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Expertise:

Software: Full lifecycle software development as requirements management, solution architecture, implementation and testing. Large and small scale software development ranging from Enterprise class solution development to small embedded real time software development. Design and develop large array of algorithms for signal, image, video and content processing. Performance and algorithmic analysis of software components with strong mathematical basis.

Hardware: Large image/video-based hardware solutions with pipeline and microprocessor based system for simple and complex applications. Interface of high performance imaging components into a digital infrastructure at chip and camera level designs. Single board systems with high performance devices for time critical controls.

Science: Strong ability for analysis and understanding of all diagnostic imaging modalities such as all X-ray, Nuclear Medicine and Ultrasound imaging modalities in terms of energy source, detectors and intermediate processing. Proven record of introducing new concepts to existing problems using physical and mathematical models. Strong ability to analyze, design and develop signal/image/video/content processing algorithms and in particular develop various computed processing algorithms for demanding problems.

Education:

Ph.D. in Electrical Engineering
University of Maryland at College Park (UMCP), May 1997
Major Field of interest: Control and Communication theory
Thesis Topic: Document Image Compression and Analysis

M.S. in Electrical Engineering
University of Illinois at Chicago (UIC), August 1989 G.P.A. 5.0/5.0
Major Field of Interest: Control theory and Automation
Master's Project: Streamlined Methodology for Digital Controller Design.

B.S. in Electrical Engineering
Catholic University of America (CUA), May 1987, G.P.A. 4.0/4.0
Major Field of Interest: Computer Engineering and Control
Senior Design Project: Design and Implementation of an Underwater Dive Computer.

Accomplishments:

Chief Scientist, Northstrat: Grew new science ventures while supporting customer contract on a full-time basis.
Chief Engineer, ITT Exelis: Grew the company footprint at the customer site by promoting technical solutions and demonstrating associated value.
Principal Engineer, ITT Exelis: Patented IP and grew initial project to a long term processing chain effort at customer site.

Osseo 2019
U.S. Patent No. 6,944,262

Senior Scientist, ITT Exelis: Patented IP in fields of LIDAR, FMV, Space Weather and Radars. Landed $1.5M project associated with only one pursuit.
Chief Scientist, Imaging Sciences: Grew the company from a $2M company to $145M and beyond with a revolutionary dental imaging machine.
President, Sigma Vision: Developed revolutionary x-ray imaging product for veterinary market that is currently supporting three separate companies worldwide.

Experience:

Subject Matter Expert, Coastal Communication Consultants Inc., Manassas, VA September 2017 – Now.
Serve as a subject matter expert in the general fields image science, data science, software development and transition to operational setting. Utilize classical estimation and detection theory techniques in conjunction with feature extraction and pattern analysis to derive effective data science algorithms. Also perform software development to integrate algorithms into existing and new systems. Interface with customer requirements by educating programmers and customers on the realm of possibilities with real demonstrable techniques. Also continue to serve as the subject matter expert in the areas of video processing, compression and standards for multiple contracts. Submitted responses to Request for Information and Proposals to area customers for imaging, image processing, remote sensing, content process, signal processing and related technology oriented solutions.

Chief Image Scientist, Northstrat Inc., Sterling, VA November 2013 – September 2017.
Served as the chief image scientist and led research and development efforts with respect to all high technology development efforts. Served as the subject matter expert in the areas of video processing, compression and standards for multiple contracts. Submitted responses to Request for Information and Proposals to area customers for imaging, image processing, remote sensing, content process, signal processing and related technology oriented solutions. Support multiple programs as a subject matter expert as video processing, low light imaging, Lidar data processing, Synthetic aperture radar imaging and data fusion. Perform array of computer vision algorithms and physics-based signal processing and analysis. Utilized image science, signal processing, software development and engineering practices to bring multiple research concepts to an operational setting.

Chief Engineer, ITT Exelis, Space Systems Division, Herndon, VA October 2011 – November 2013.
Served as the chief engineer and led technical efforts in an NRO program at the Washington Innovation Center. Developed technical solutions across a large array of image and signal processing problems. Contributed to ground breaking solutions and fundamental shifts in workflow utilizing expertise in mathematics, physics, software development, hardware exploitation, market demand and business partners. Routinely applied a multi-disciplinary approach to complex problems.

Principal Scientist, ITT Exelis Space Systems Division, Herndon, VA September 2012 – November 2012.
After initial research and development in LIDAR super resolution, was awarded a contract to implement and compare results with existing LIDAR super resolution algorithms. Lead a team of scientists to implement and expand on original concept and insert in existing processing chain. Delivered results that exceeded expectations and fundamentally identified shortcomings in the current process flow. Performed this project while serving as the Chief Engineer at an NRO program.

Senior Staff Scientist, ITT Space Systems Division, Herndon, VA June 2009 – October 2011.
Serve as an expert in all pursuits pertaining to remote sensing, surveillance and image/signal processing problems. Primarily served as the lead scientist in all technical activities including space situational awareness, 3D scene modeling, persistence surveillance, super-resolution (for lidar systems), scale space compression (for lidar systems) and space weather efforts. Inventor in concepts leading to patent applications and pursuits. Leader of the Compression Cell, which creates, motivates and organizes current and ongoing capabilities in compression including image, video, volumetric and other data modes within the Space System Division group. Involved with efforts in building ideas matched to pursuits for Full Motion Video, Situational Awareness, Space Weather and several Surveillance initiatives as the primary scientist. Interests include volumetric processing, multi-mode image/data processing, radar processing, automatic target recognition, computational imaging,

compression and knowledge management which involves preliminary work for submittal into corporate and government channels for funding opportunities. These efforts require substantial knowledge of the current state of the art and fundamental understanding of strengths and weaknesses of prevailing methodologies in order to make a viable case for pursuit.

Expert Consultant, Part-time consulting, Jan 2002 – now.
Perform expert consulting for Intellectual Property and High Technology development. Intellectual property consulting in all areas of high technology and in particular, imaging, compression, encryption, standard based encoding, consumer devices, medical devices, patient management, embedded solutions and smart energy. Work involves expert analysis of portfolio holdings, analysis of potential infringers, licensing opportunities and litigation support. High technology development in areas of medical imaging, electrical health record, medical devices and smart energy devices have been pursued with inventions being pursued. Consult in dental imaging and in particular Cone Beam Computed Tomography and Podiatric Radiography. Perform consulting for law firms, patent analysis firms and high technology companies.

Chief Scientist, Imaging Sciences International, Inc. Hatfield, PA Jan 2004 – April 2009.
Chief Scientist and director of digital X-ray Development. Perform, direct and manage all technical directives falling under digital imaging including software development, hardware development, receptor development and various signal/image processing algorithms. As chief scientist I performed the first look at all 3rd party technology suggestions and assessed value for our product. These spanned technologies across software, hardware and physics based (primarily x-ray and visible light) solutions. Spearheaded a detector development effort which involved working with internal and external resources along with performance based selection of outside vendors. These detectors are designed to operate under very low light conditions and efficient manner. Served as the primary Intellectual Property Manager for all patent related work for Imaging Sciences and other sister companies, under the Danaher umbrella, dealing with imaging work. In this capacity I managed a group of scientists and lawyers to address all aspects of patent related issues including foreign filings, office action response, infringement cases and new technology protection. Write detailed white papers, patents and articles for state of the art technologies. Performed due diligence activities for large purchases in terms of technology assessment, competitive analysis, resource utilization and product roadmaps. This was the lead technical role in several acquisitions.

In a development capacity, developed and inspired unique functional components for a next generation head and neck computed tomography unit. Invented algorithms in scatter correction, focal trough detection and various visualization mechanisms. Developed a revolutionary panoramic image capture modality that enables the practitioner to perform unprecedented imaging. Performed management duties for volume understanding (segmentation, estimation and detection of physical shapes) and movement detection algorithms for integration into a motion corrected sensor. Developed hardware assisted processing to offload processing requirements to dedicated components using soft core FPGA programming, embedded LINUX, integrated microprocessor devices and software interface. Various Optical, X-ray and Nuclear image modalities are used to enable a growing market segment.

President, Sigma Vision Inc. Rockville MD Jan 2002 – Dec 2003.
Co-founder of Sigma Vision which was originally incorporated to serve as a shell for consulting activities in the high technology area specifically in the image and signal processing platforms. Researched, designed and developed a line of products which spans Radiography/Fluoroscopy imaging in X-Ray modality**, Computed Radiography** (CR) in X-Ray modality, **Digital Radiography** (DR) in X-Ray Modality, Picture Archiving in all modalities and various image processing packages. Provided detailed expertise to vendors that have development work in the same area. In all aspects of this work, performed cutting edge HW/SW techniques to provide a solution along with algorithm development to overcome sensor shortcomings. The result was a stable and cost-effective offering to small and medium size diagnostic imaging centers. Performed research with several national laboratories for custom signal processing such as adaptive contrast enhancement, image stitching and mosaic, cone-beam CT and other diagnostic related imaging. The diagnostic imaging products were applied to human, veterinary and non-destructive testing applications. In a non-medical capacity, Performed several large scale consulting in areas of **Video over IP**, debugging proprietary image processing algorithms, serve as **expert witness** in large scale patent litigations and general medical imaging product development.

Senior Vice President, Portris Inc. Reston VA February 2001 – November 2001.
In charge of front-end **application development**, all **research and development** effort, high level **algorithm development** and technology assessment. As the first technology hire of Portris Inc., helped implement the company for product development and Venture Capital funding, provided key technology and solutions in order to achieve a suite of meaningful patents, defined product suite and development plan and in-depth architecture and planning of the product. Formulated the basis of a collaborative knowledge management system by separating content and presentation; and further decomposing content in terms of a relational paradigm of basic constituent atomic knowledge elements to for a higher level of understanding. Implemented the relational aspect in a database utilizing an appropriate **data model** that supported several abstract applications. Also provided key components of knowledge representation and modeling from inception to development. Was the leading technology and solution provider in all areas of **computing, operating systems, development platform, front-end systems, back-end systems and knowledge representation.** Served as the chief scientist for all of the technical related activities.

Principal Consultant, Sigma Vision, Inc. North Bethesda, MD July 2000 – May 2002.
Performed consulting services, which included proposal writing, submission, research and development. Wrote proposals for **Video Over IP, Video surveillance and Document Duplicate Detection** for submissions to government and private industry. Performed research and development in **Video Over IP** for thin clients that were java enabled. Performed design, analysis and modeling of the system for a complete software development cycle. Served as an expert witness in patent enforcement phase of Intellectual Property Law. Researched and analyzed various **X-Ray imaging** products and provided insight into their software, hardware and physics based operations. Provided technical assistance for medical imaging companies in planning, development and debugging of their systems. Developed imaging workstations for Computed Radiography, Special Purpose Video Capture and overall system design and integration. Developed embedded solutions for X-ray arm and table movement for collision avoidance.

Chief Technical Officer, IMACOM, Inc. Rockville MD October 1999 – January 2001.
In charge of all technical work including hardware and software research, design and implementation for **X-Ray medical imaging** application. In this position, developed software and hardware solutions, debug software and hardware problems in the system and formulated company strategy for attainable product bases. In this position, as hardware designer, used Field Programmable Logic Array to develop a **video pipeline processing, real-time storage** of live video to computer hard disks, develop **analog filter and signal exchange banks** for analog signals, designing and integrating custom graphics video cards and control systems**.** Also in this position, as software engineer, designed **threading software for real-time storage,** improved **image processing** capabilities and compression, created custom software, and planned, designed and implemented new customer solutions. In this capacity, managed a group of hardware and software engineers, planned and estimated project life-cycles, and was involved with new technology research and development such as **high resolution ultrasound imaging**, large format X-Ray imaging and **Video Surveillance.**

Electronics Engineer (Research Scientist), National Institute of Standard and Technology, Gaithersburg, MD (NIST), April 1997 – November 1999.
Member of the Multimedia and Digital Video Group, Advanced Technology Division and Information Technology Laboratory. Worked on various projects including **document image processing**, an extension of Ph.D. research, **Large image-browsing, multimedia compression and communication, medical image understanding, digital library metrics,** and **image and video indexing** problems. Used **mathematical formulation** and **media processing tools** to find new and innovative techniques to archive, process and transmit information. Worked on **pattern recognition and feature extraction** research for medical application. Initiated interest in **video indexing** and **digital library metrics** research in the group. Performed as a principal investigator in the above projects. Attended MPEG standardization meetings to provide technical expertise to NIST's Advanced Technology Program's initiatives.

Affiliate Research Scientist, Center for Automation Research (CfAR), Language and Media Processing Laboratory (LAMP), University of Maryland, College Park MD, April 1997 – present.
Hold an affiliate research scientist position at LAMP to collaborate with researchers at the lab in areas such as **video indexing and image enhancement and multimedia processing, archiving and indexing.**

Part time lecturer, University of Maryland Baltimore County (UMBC), Department of Computer Science, August 1998 – September 1999.
Held a lectureship position at UMBC teaching Assembly language programming. This position is held under an accredited program for a computer science curriculum.

Graduate Research Assistant (GRA), Center for Automation Research (CfAR), University of Maryland, College Park, MD March 1995-April 1997.
Worked with Dr. David Doermann (co-director of LAMP) with Professor Rama Chellappa (Associate director of CfAR) as the academic advisor.
Ph.D. Thesis: Document image compression and analysis: constructor of an information hierarchy geared towards **information retrieval**. Preservation of symbol **Structure** was exploited to yield natural extensions to **lossy compression, progressive transmission** and promotion of **compressed-domain** document image processing. Various concepts were considered including **vector quantization, wavelet transforms, pattern matching and entropy analysis** to demonstrate performance and feasibility. Several mathematical analysis tools were used along with application development and testing.
Projects: Involved in handwriting character recognition utilizing **energy minimization** techniques to reconstruct handwritten strokes. A priori knowledge of character shapes was used to detect and segment off-line characters. The unique aspect of this research was exploitation of connected features **(primitives)** and use of an appropriate cost function to optimize a **minimum cost solution.** Also of interest was derivation of the detected character's stability and **region of convergence** to determine a goodness of fit parameter for higher-level programming. Part of this research involved **mathematical analysis** in the field of **optimization** and **control** with applications to the field of **image processing.** The rest involved programming and proof of principle. Was one of the pioneering researchers to develop the document duplicate detection work at the lab. Utilized **Region of Convergence** performance criteria and **random-process analysis** in conjunction with **Tree-based** search algorithm and **N-Gram** signature creation to prove, design and implement a complete detection system.

Research Engineer, Glynn Scientific Inc. Annapolis, MD Oct. 1989- Oct. 1994.
Analysis: Performed optimization analysis on several cost functions spanning various performance criteria. Used **Matrix Algebra, optimal control theory,** and **partial differential analysis** to derive various optimal conditions. Performed analysis on fingerprints, OCR, SONAR systems and stock market performance problems. While performing such tasks, played the role of program manager in some cases and task leader in others. Also involved in writing problem statements, statements of work, required time and manpower for purposes of project life analysis and system requirements for the overall package.
Image processing: Performed various image enhancements to aid in feature finding, classification and detection algorithms. Analyzed pattern recognition problems using **quadratic Bayes** algorithms, **maximum likelihood** algorithms, **nearest neighbor** algorithms and **model/template matching** algorithms. Also applied neural network techniques for feature extraction and pattern recognition. Image enhancement was done in the fingerprint and OCR cases. Pattern recognition and detection were performed on fingerprints, OCR, SONAR and RADAR problems. Responsibilities included program management, principal researcher and support.
RADAR: Supported data acquisition and proof of principle pertaining to **ATR** concepts. Designed and tested performance analysis tools to be used for classification of various targets. Analyzed system performance under limited conditions using noise, resolution and target models. Involved in overall system support and syntactic implementation. Responsibilities for these tasks were only in support and did not involve full time effort.
ASW: Performed and analyzed various methods of **signal processing** and **detection** for implementation in sonar systems. Various signals were designed with frequency and phase hopping characteristics in order to meet system requirements for **counter-detection, resolution in range and Doppler.** Effects of **multi-path** and **reverberation** were considered. Statistical **probabilities of detection, signal interception and false alarms** were thoroughly investigated. Adaptive and standard signal processing algorithms were utilized for improved performance under certain conditions (including ESPRIT and MUSIC algorithms). Supported design and data processing related to ASW platform sea tests. Mostly involved in a support role while taking the lead in the area of statistics in counter detection.
Systems Administration: As the systems manager, responsible for maintaining the in-house computer systems and for recommending new technology and solutions for the company's computing needs. Special tasks included installing and streamlining work to be done on an array processor and providing compatible modes of data transfer.

Research/Teaching Assistant, Department of Electrical Engineering and Computer Science, UIC, Chicago, IL. September 1987 to August 1989.
Research: Digital signal processing and homomorphic analsysis on arterial load for isolating reflection. Control system design and analysis was done for master's work. Continuous and discrete time control were thoroughly investigated for process control. Exploited the characteristics of process control plants to get a robust controller able to withstand the changing of the process and simple enough to re-tune with a calculator.
Teaching: Taught departmental courses in computer architecture and computer programming which included classes in excess of 30 students. Taught laboratory and discussion sessions on a wide variety of subjects including, but not limited to, computer programming, circuits, electric machinery and control systems.

Research Engineer, School of Engineering and Architecture, CUA, Washington DC, September 1985 – August 1987.
Worked as a systems engineer in the robotics lab and the CAD lab. Designed and built peripheral circuitry for the computer and control of various robot actuators. Performed experiments to control an underwater robot. Was very active in computer programming and hardware design. Designed voice synthesizer board and wrote machine language program to use the board. Designed and implemented a microprocessor-based device to notify an underwater diver of depth, time under water, time left with air in tank and decompression depth and time needed. This device was designed using a 6800 microprocessor, UV-Prom and associated electronics.

Consulting Experience:

Coastal Communication Consultants, Inc., September 2017 – Now. Serve as a consultant and a contractor to various opportunities as a Subject Matter Expert in the general area of image and data science.

GHB Intellect, June 2013 – Now. Provide consulting services for patent and intellectual property review and analysis.

Northstrat Inc, November 2013 – September 2017. Serve as a consultant and a contractor to various opportunities as a Subject Matter Expert in the general area of image science.

Parsa Wireless Communications, February 2012 – April 2016. Provide consulting services for patent and intellectual property review and analysis.

ITT-Exelis-Harris, June 2009 – November 2013. Serve as a consultant and a contractor to various opportunities as a Subject Matter Expert in the general area of image science.

Patents:

- O. Kia, Secure and mobile biometric authentication for electronic health record management, US Patent 9,553,727 on January 24, 2017.
- O. Kia, Digital Radiographic Device Having a Linear Scanner, US Patents 8,662,749, 9,125,571 and 9,380,989 on March 4, 2014, September 8, 2015 and July 5, 2016.
- O. Kia and J. Graybill, System and method for providing temporal-spatial registration of images, US Patent 9,071,819, June 30, 2015.
- C. Rodgers and O. Kia, System and method of visualization of species characterization, dynamics and stratification of the magnetosphere, US Patent 9,037,413, May 19, 2015.
- O. Kia, Methods, apparatus, and systems for super resolution of LIDAR data sets, US Patent 8,818,124, August 26, 2014.
- O. Kia and C. Rodgers, System and method of visualization of species characterization, dynamics and stratification of the magnetosphere, US Patent 8,616,052, December 31, 2013.

- O. Kia and S. Dockstader, Photogrammetric method and system for stitching and stabilizing camera images, US Patent 8,559,757, October 15, 2013.
- H. Tancredi, E. Marandola, F. Speranza, and O. Kia, Adjustable scanner, US Patent 8,503,603, August 6, 2013.
- O. Kia, C. Rodgers and B. Bradford, Systems and Methods for Space Situational Awareness and Space weather, US Patent 8,193,968, June 5, 2012.
- A. Singh, E. Marandola, O. Kia and U. Mundry, Locating an Elongated Object in a Three Dimensional Data Array, US Patent 7,817,830, October 2010.
- O. Kia, K. Subramanyan and P. Crawn, Method and Apparatus for Generating A Panoramic Image By Combining Image Data Generated From Multiple Perspectives, US Patent 7,756,247, July 2010.
- J. Gregorio and O. Kia, Cephalometric X-ray Imaging Apparatus, Patent Application 20090196395, August 2009.
- A. Singh, E. Marandola, O. Kia and U. Mundry, Generating Panoramic Views of the Jaw Using a Fixed Reference Point and Crossing Points of Multiple Rays, US Patent 7,545,909, June 2009.
- A. Singh and O. Kia. Location of focal place. US Patent 7,460,638, Dec. 2008.
- O. Kia, A. Singh, E. Marandola and U. Mundry, Scatter Correction, Patent Application 20070086560, April 2007.
- K. Hartigan, S. Hunter, D. Loukonine, B. Morgan and O. Kia. Method and System for Tracking and Reporting Time Spent on Tasks. US Patent 6,832,176, Dec. 2004.
- C. Henderson and O. Kia. Method and System for Collaborative Knowledge Management, United States Patent Application, 20030009536, Jan. 2003.

Publications:

- A. Bright, O. Kia, J. Graybill, S. Cruz, Shape-based topologies for real-time onboard image generation. In proceeding of the SPIE, Airborne Intelligence, Surveillance, Reconnaissance (ISR) Systems and Applications IX, volume 8360, May 1, 2012.
- C. Rodgers and O. Kia, Ionosphere Mitigation Through Species Characterization And Stratification, AMS Annual Meeting, *8th Conference on Space Weather,* Spokane, Washington, January 2011.
- O. Kia, C. Rodgers and B. Bradford, Dual use RF-based Sending for Proximity and Space Weather Event Detection. In proceeding of the *SPIE, Radar Sensor Technology XIV,* volume 7669 pp. 76690C-7669C-12, 2010.
- O. Kia, 3D Imaging: Should I go digital, Orthodontic Products, June 2004.
- O. Kia and D. Doermann. Residual coding in document image compression. *IEEE Transactions on Image Processing,* 9:961-969, 2000.
- O. Kia, J. Vossoughi, G. Lopez and S. Sirohey. Image Based Evaluation of Vascular Residual Strain. In *International Journal of Artificial Intelligence Tools,* 9:247-263, 2000.
- O. Kia, D. Doermann, A. Rosenfeld and R. Chellappa. Symbolic compression and processing of document images. *Computer vision and Image Understanding,* 70:335-319, 1998.
- O. Kia and D. Doermann. Document image coding for processing and retrieval. *Journal of VLSI Signal Processing Systems for Signal, Image and Video Technology,* 20:121-135, 1998.
- H. Li, D. Doermann and O. Kia. Automatic Text Detection and Tracking in Digital Video. *IEEE Transactions on Image Processing,* 9:147-156, 2000.
- H. Li, D. Doermann and O. Kia. Text Extraction, Enhancement and OCR in Digital Videos. *Book chapter in Springer Verlag, 1999.*
- D. Doermann, H. Li and O. Kia. The detection of duplicates in document image databases. In *Image Vision and Computing Journal,* (16) 12-13 (1998), pp 907-920.
- Omid E. Kia. *Document Image Compression and Analysis.* Ph.D. thesis, University of Maryland, College Park, 1997.
- O. Kia, S. Sirohey and J. Vossoughi. Image-based Evaluation of Vascular Residual Strain. In proceedings of the *International Conference on Information Intelligence and Systems, pp. 444-451, 1999.*
- J. Sauvola and O. Kia. Distributed Processing of Multimedia Extended Documents. In the proceedings of the *International Workshop on Multimedia Signal Processing, 1999.*
- O. Kia, J. Sauvola and D. Doermann. Network-diffused media scaling for multimedia content services. *In Interactive Distributed Multimedia Systems and Telecommunication Services,* Eds. M. Diaz, P. Owezarski

and P. Senac. In proceedings of the *International Workshop on Interactive Distributed Multimedia Systems and Telecommunications Services, pp. 149-162, 1999.*

- H. Li, O. Kia and D. Doermann. Text Extraction and Recognition in Digital Video. In the proceedings of the *International Workshop on Document Analysis Systems,* pp 119-128, 1998.
- H. Li, D. Doermann and O. Kia. Automatic Text Extraction and Tracking in Digital Video. *LAMP Technical Report,* LAMP-TR-028, CAR-TR-900, CS-TR-3962, Dec. 1998.
- H. Li, O. Kia and D. Doermann. Text Enhancement in Digital Video. In the proceedings of the *SPIE – Document Recognition and Retrieval,* volume 3651, pp 2-9, 1999.
- O. Kia and J. Sauvolla. Active documents for mobile services. In the proceedings of the *IEEE workshop on Multimedia Signal Processing,* pp. 227-232, 1998.
- O. Kia and A. Schaff. Data Representation and Handling for Large Image Browsing. In the proceedings of the *SPIE – Multimedia Storage and Archiving Systems,* pp. 37-46, 1998.
- O. Kia and D. Doermann. OCR-based Rate-Distortion Analysis of Residual Coding. In the proceedings of the *International Conference on Image Processing,* Volume III, pp. 690-693, 1997.
- O. Kia and D. Doermann. Integrated Segmentation and Clustering for Enhanced Compression of Document Images. In the proceedings of the *International Conference on Document Analysis and Recognition,* Volume I, page 406, 1997.
- O. Kia and D. Doermann. Document Image Coding for Processing and Retrieval. In Proceedings of the *IEEE Workshop on Multimedia Signal Processing,* pp. 331-336, 1997.
- J. Sauvola and O. Kia. Hyperdocument management for compression, transmission and processing. In Proceedings of the *IEEE Workshop on Multimedia Signal Processing,* pp. 537-542, 1997.
- O. Kia and D. Doermann. Structure-preserving Image Compression and Transmission. In Proceedings of the *International Conference on Image Processing,* Volume I, pp. 193-196, 1996.
- O. Kia and D. Doermann. Symbolic Compression for Document Analysis. In Proceedings of the *International Conference on Pattern Recognition*, Volume III, pp. 664-668, 1996.
- O. Kia, D. Doermann and Rama Chellappa. Compressed-domain Document Retrieval and Analysis. In Proceedings of the *SPIE – Multimedia Storage and Archiving Systems,* Volume 291, pp. 176-187, 1996.
- D. Doermann and O. Kia. Hybrid thinning through reconstruction. In Proceedings of the *International Conference on Document Analysis and Recognition,* Volume II, pp. 632-635, 1995.

Expert Witness Cases:

The following is a complete list of cases which I have provided expert opinions through either trial testimony, deposition, report, or declarations.

District of Delaware – Fenster Family Patent Holding *et al.* v. Philips Medical *et al.* – Consultant and arbitration for the plaintiff.

4:03-CV-276 – Eastern District of Texas, Sherman – STM v. Motorola *etc al.* – Expert report for the plaintiff.

C.A. No. 04-0048 – District of Delaware – Fenster Family Patent Holding *et al.* v. Siemens Medical Solutions USA *et al.* – Expert report and Deposition assistant for the plaintiff.

04-CV-01363 – Southern District of New York – John Amico *et al.* v. Nhega LLC *et al.* – Expert report for the plaintiff.

2:08CV389 – Eastern District of Texas, Marshall Division – Hospital Systems Corporation v. General Electric Company *et al.* – Expert report for invalidity for the plaintiff.

22-C-09-000274 MM – Circuit Court for Wicomico County, Maryland, Diana Donaway et al, v. Jodi D. Jones M.D. et. al. – October 2010 – Expert for Defendant on HIS system.

Patent Interference No. 105,890 (SCM) – USPTO: Patent Trial and Appeal Board – Andreas Kotowski *et-al* (Rapiscan Systems, Inc.) v. Richard Mastronardi et-al (American Science and Engineering Inc.) – June 2013.

2:10-CV-00029 – Eastern District of Texas, Marshall – Princeton Digital Image Corporation v. Canon Inc *et al.* – Expert consulting for plaintiff.

Patent Re-examination 90/013,078 – USPTO: Declaration for patent examination for Joseph P. Jaronczyk Jr. of LittelFuse, Inc. – June 2014.

2:13-cv-0052 – Eastern District of Texax, Marshall – Trover Group Inc. etc. al. v. Tyco International LTD et. al, - April 2014 – Expert for plaintiff.

1:14-cv-00261-UNA – District court for the District of Delaware – Celebrate International LLC v. LeapFrog Enterprises, Inc. et. al., February 2014 – Expert for plaintiff.

Inter Partes Review of US Patent No. 5,751,346, AXIS Communications Inc. et. al. v. Trover Group Inc. – United States Patent and Trademark Office before the Patent Trial and Appeal Board – December 2014 – Expert for Defendant.

Civil No. 385518V, The Circuit Court for Montgomery County, Maryland, ProExpress Distributors LLC v. Grand Electronics, Inc. Et. Al., February 2015 – Expert for defendant.

2:13-cv-1047-JRG Consolidated Lead case, United States District Court for the Eastern District of Texas Marshall Division, Trover Group Inc. and the Security Center Inc. v. Dedicated Micros Inc. et. al., April 2015 – Expert for plaintiff

12CV0380 CAB (DHB) United States District Court Southern District of California, SONIX Technology Co. Ltd. v. Kenji Yoshida and Grip IP, PTE, Ltd, April 2015 – Expert for defendants.

1:11-cv-00117-LY Consolidated Lead Case, United States District Court for the Western District of Texas Austin Division, Source Prose, Inc. v. AT&T Mobility et. al, May 2015 – Expert for Plaintiff.

13-cv-453-SLR-SRF, United States District Court for the District of Delaware, Intellectual Ventures I et. al, v. Toshiba Corporation et. al. December 2015 – Expert for Plaintiff.

6:14-cv-680-RWS, Consolidated case, United States District Court Eastern District of Texas Tyler Division, TracBeam LLC, v. T-Mobile US, Inc. et al, and TracBeam LLC, v. Apple Inc., March 2016 – Expert for Plaintiff.

2:15-cv-1503, United States District Court for the Eastern District of Texas, Marshall Division, TIVO Inc. v. Samsung Electronics Co. LTD et al., April 2016 – Expert for Defendant.

IPR2016-00212, Inter Partes Review of U.S. Patent 7,974,339, Google Inc. v. Vedanti Systems Limited – United States Patent and Trademark Office before the Patent Trial and Appeal Board – May 2016 – Expert for defendant.

2:15-cv-01274-JRG-RSP, Blitzsafe v Honda et. al., United States District Court for the Eastern District of Texas Marshall Division – August 2016 – Expert for Plaintiff.

2:16-cv-980, Intellectual Ventures II LLC v. FEDEX Corp et al. United States District Court for the Eastern District of Texas Marshall Division – March 2017 – Expert for Plaintiff.

8:16-cv-01194-MSS-TGW, University of South Florida Research Foundation, Inc. v. Fujifilm Medical Systems USA, United States District Court for the Middle District of Florida, Tampa Division – July 2017 – Expert for Plaintiff.

Investigation No. 337-TA-1061, In the Matter of Certain Bar Code Readers, Scan Engines, Products Containing the Same, and Components Thereof, United States International Trade Commission, Honeywell v. Code – October 2017 – Expert for Plaintiff.

4:16-cv-03595, Arya et al v. Dufossat et al, United States District Court for the Southern District of Texas, Houston Division – February 2018 – Expert for defendant.

1:12-cv-01461, Princeton Digital Image Corporation v. Konami Digital Entertainment Inc., et al. United States District Court for the District of Delaware – May 2018 – Expert for Plaintiff.

2:17-cv-00516-JRG, AGIS v Apple, et al. United State District Court for the Eastern District of Texas Marshall Division – July 2018 – Expert for Plaintiff.

IPR2018, Inter Partes Review of U.S. Patent 8,331,715, Samsung Electronics Co. LTD. v. Fotonation Limited – United States Patent and Trademark Office before the Patent Trial and Appeal Board – November 2018 – Expert for Plaintiff.

17-1059, First Wheel Management Limited v. Inventist, Inc. and Shane Chen, United States District Court for the District of Delaware – January 2019 – Expert for Plaintiff.

IPR2019-00218, Inter Partes Review of U.S. Patent 7,965,408, Altamont Software Inc. v. Sorna Corporation – United States Patent and Trademark Office before the Patent Trial and Appeal Board – February 2019 – Expert for Defendant.

2:17-cv-00422-JRG, Blitzsafe v Mercedes et. al., United States District Court for the Eastern District of Texas Marshall Division – April 2019 – Expert for Plaintiff.

C.A. No. 17-1386-LPS-CJB, Osseo Imaging v Planmeca USA, United States District Court for the District of Delaware, May 2019, Expert for Plaintiff.

Civil Action No. 2:18-cv-00506-JRG, UNILOC v. Samsung et al, United States District Court for the Eastern District of Texas Marshall Division – September 2019 – Expert for Plaintiff.

2:18-CV-00171-RWS-RSP, CXT Systems v. Academy et al, United States District Court for the Eastern District of Texas Marshall Division – September 2019 – Expert for Plaintiff.

Investigation No. 337-TA-1061, In the Matter of Certain Bar Code Readers, Scan Engines, Products Containing the Same, and Components Thereof, United States International Trade Commission, Honeywell v. Opticon – October 2019 – Expert for Plaintiff.

C/09/591436, Hand Held Products v. Opticon, District Court The Hague – July 2020 – Expert for Plaintiff.

2:19-cv-00361-JRG, AGIS v. Google et al, United States District Court for the Eastern District of Texas Marshall Division – September 2020 – Expert for Plaintiff.

C.A. No. 20-842 (CFC) AMO v. ALCON v. AMO & Johnson & Johnson, District Court for the District of Delaware – February 2021 – Expert for Plaintiff in counter suit.

IPR2021-01003, Inter Partes Review of U.S. Patent 8,398,236, Johnson & Johnson Surgical Vision Inc, v. ALCON Inc – United States Patent and Trademark Office before the Patent Trial and Appeal Board – September 2021 – Expert for Defendant.

2:20-cv-00349-JRG LONGHORN HD v. NETSCOUT SYSTEMS, District Court for the Eastern District of Texas, Marshall Division – July 2021 – Expert for Plaintiff.

2:21-cv-00099-JRG LONGHORN HD v. JUNIPER NETWORKS, District Court for the Eastern District of Texas, Marshall Division – November 2021 – Expert for Plaintiff.

2:20-cv-0319-JRG, 2:21-cv-0110-JRG United Services Automobile Association v. PNC Bank, District Court for the Eastern District of Texas, Marshall Division – July 2021 – Expert for Defendant.

Investigation No. 337-TA-1285, In the Matter of Certain Bar Code Scanners, Mobile Computers with Barcode Scanning Capabilities, Scan Engines, and Components Thereof, United States International Trade Commission, Honeywell v. Zebra – September 2021 – Expert for Plaintiff.

IPR2022-00218, Inter Partes Review of U.S. Patent 7,400,704, Sigray Inc, v. Carl Zeiss X-Ray Microscopy Inc – United States Patent and Trademark Office before the Patent Trial and Appeal Board – November 2021 – Expert for Plaintiff.

2:21-cv-00148-JRG NETWORK MONITORING LLC v. SKYSCANNER LTD, District Court for the Eastern District of Texas, Marshall Division – February 2022 – Expert for Plaintiff.

IPR2022-01576, Inter Partes Review of U.S. Patent 9,538,985, Butterfly Network Inc., v. FujiFilm Sonosite, Inc. – United States Patent and Trademark Office before the Patent Trial and Appeal Board – September 2022 – Expert for Plaintiff.

5:21-cv-01129-EJD, Carl Zeiss X-ray Microscopy, Inc, v. Sigray Inc., District Court Northern District of California – October 2022 – Expert for Defendant.

2:20-cv-00851-TSZ, International Business Machines Corporation v. Zillow Group, Inc., District Court Western District of Washington at Seattle – October 2022 – Expert for Plaintiff.

IPR2022-01374, Inter Partes Review of U.S. Patent 7,557,711, Zebra Technologies Corporation, v. Lone Star SCM Systems, LTD – United States Patent and Trademark Office before the Patent Trial and Appeal Board – October 2022 – Expert for Defendant.

6:22-cv-004433, 3SHAPE A/S v. Medit Corp, District Court for the Western District of Texas, Waco Division – December 2022 – Expert for Defendant.

Investigation No. 337-TA-1324, In the Matter of Certain Mobile Electronic Devices, United States International Trade Commission, Maxell v. Motorola, Lenovo et. al. – November 2022 – Expert for Defendant.

5:22-CV-00069-RWS, Pantech v. OnePlus, District Court for the Eastern District of Texas Texarkana Division – August 2023 – Expert for Defendant.

IPR2023-00890, 00934, 01017, Inter Partes Review of U.S. Patents 8,014,943, 8.478,527 and 8,032,297, BMW of North America LLC v. Northstar Systems LLC – United States Patent and Trademark Office before the Patent Trial and Appeal Board – January 2024 – Expert for Defendant.

3:23-cv-1937, Kustom Signals Inc. v. Applied Concepts Inc., District Court for Northern District of Texas Dallas Division – January 2024 – Expert for Plaintiff.

Investigation No. 337-TA-1379/1380, In the Matter of Certain Certain Video Capable Electronic Devices, Including Computers, Streaming Devices, Televisions, and Components and Modules thereof, United States International Trade Commission, Nokia v. Hewlett Packard, Amazon et. al. – March 2024 – Expert for Plaintiff.

5:23-CV-00092-RWS, Maxell v. Samsung, Eastern District of Texas Texarkana Division – October 2024 – Expert for Defendant.

IPR2025-00635, 00314, 00275, 00314, 00316, 00275 Inter Partes Review of U.S. Patents 11,871,088, 10,425,697, 11,039,218, 10,425,697, 10805687 and 11039218 Sportradar AG v. SportsCastr Inc – United States Patent and Trademark Office before the Patent Trial and Appeal Board – December 2024 – Expert for Plaintiff.

IPR2024-00923, 00924, 00925, Inter Partes Review of U.S. Patents 10,873,685, 7,612,805, and 8,451,339, SONY Corporation v. Optimum Imaging Technologies LLC – United States Patent and Trademark Office before the Patent Trial and Appeal Board – January 2025 – Expert for Defendant.

2:25-cv-00081-JRG, Valtrus Innovations LTD v. The Home Depot Inc, Eastern District of Texas Marshall Division – January 2025 – Expert for Plaintiff.

Computer Languages:

C/C++ (UNIX, MS-Windows), Visual Basic, JAVA (Unix, Windows, Symbian EPOC), Assembly language (8086, 68000, Z80) and Matlab.

Systems:

X86 (MS-Windows, LINUX, DOS), Sun SPARC (SunOS, Solaris), UNIX (HPUX, AIX, SGI), Macintosh, IBM Mainframe, Digital VAX/VMS.

Associations and awards:

Affiliate research faculty at University of Maryland at College Park, Language and Media Processing Laboratory and University of Oulu, Finland, Information Processing Laboratory.
Member of Tau Beta Pi, Eta Kappa Nu, and IEEE Computer and Signal Processing Group, 1983-present.
Tuition Scholarship recipient, UIC, 1987-1989.
Dean's List, CUA, 1985-1987.